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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,774	08/18/2003	Adrian Maxim	55123P238	3673

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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER

VAN ROY, TOD THOMAS

ART UNIT PAPER NUMBER

2828

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,774

Applicant(s)

MAXIM ET AL.

Examiner

Tod T. Van Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11, 13-18, 20 and 22-27 is/are rejected.
- 7) ☒ Claim(s) 10, 12, 19, 21 and 28 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/10/2003.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Drawings

Figures 3-11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 27 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 27 recites a bandgap reference limitation that has already been established inside of independent claim 22.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1-3, 5-9, 13, 15-18, and 22-26 recite the limitation "the modulation current". There is insufficient antecedent basis for the limitation in these claims.

Claims 2, 3, 13, and 22 recite the limitation "the output bias current". There is insufficient antecedent basis for the limitation in these claims.

Claims 3, 13, and 22 recite the limitation "the power supply voltage". There is insufficient antecedent basis for the limitation in these claims.

Claims 4, 11, 20, 22, and 27 recite the limitation "the predriver gain stages". There is insufficient antecedent basis for the limitation in these claims.

Claims 7, 8, 9, 16, 17, 18, 24, 25, and 26 recite the limitation "the predriver bias current control". There is insufficient antecedent basis for the limitation in these claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan (US 6859473) in view of Schuelke et al. (US 6879608).

With respect to claim 1, Tan teaches a laser driver comprising: a cascoded output switch (fig.3 #310,300) having a pair of output devices (fig.3 #310) and a pair of cascode devices (fig.3 #310); a resistor providing tail current to the output devices (fig.3 rectangular element below #300, same symbol used to represent resistor #260); a predriver circuit (fig.2 #60) receiving an input signal (fig.2 #100) and controlling the output devices (fig.2 #130); a feedback circuit coupled the resistor to control the modulation current of the output devices by control of bias on the predriver circuit (fig.3 #194 thru fig.2 #130, col.4 lines 19-35, monitor diode current fed back to create offset which is used to change the modulation current). Tan does not teach a common mode feedback circuit providing modulation dependent currents for the predriver. Schuelke teaches a laser driver utilizing a common mode feedback circuit providing modulation dependent currents for the predriver (fig.3 loop starting at #62 thru op-amp #59 to predriver side near #12,14; col.3 lines 27-30 (common mode voltage), col.4 lines 15-19 (speaking of the modulation current)). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser driver of Tan with the feedback of Schuelke in order to provide an increased laser driver compliance voltage over all operating conditions and eliminate need for AC coupling to the diode (Schuelke, col.4 lines 20-25).

With respect to claim 2, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, and further teach the on-chip summation of the

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modulation current and output bias current (Tan, fig.2 bias #186 and mod #184 summed at #190 and output to driver at #192) at a low impedance node of the active cascode device (Tan, fig.3 #184 and #186 enter active cascode at low impedance node).

With respect to claim 6, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, and further teach the modulation current to be externally adjustable (Tan, fig.2 #120, set value adjustable externally).

With respect to claims 7 and 9, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, and further teach the driver to be an integrated circuit (Tan, col.4 lines 39-40) and the predriver bias control (Tan, fig.2 #110, set value adjustable externally) and the modulation current are independently externally adjustable (Tan, fig.2 #120, set value adjustable externally).

With respect to claim 8, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, and further teach driver to be an integrated circuit (Tan, col.4 lines 39-40) and the predriver bias control (Tan, fig.2 #110, set value adjustable externally) and the modulation current are externally adjustable (Tan, fig.2 #120, set value adjustable externally). Tan and Schuelke do not teach the change to be made by a single adjustment. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the bias and modulation currents into one signal as it is well known in the art to combine two related control signals into one in order to reduce time needed to make changes to the controlled device.

Claims 3-5 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan in view of Schuelke and further in view of Royer et al. (US 5043992).

With respect to claim 3, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, but do not teach the driver to use a cascode bias circuit coupled to bias the cascode devices to a bias voltage responsive to the power supply voltage, output bias current, and the modulation current. Royer teaches a laser driver utilizing a cascode bias circuit responsive to the power supply voltage, output bias current, and the modulation current (fig.9 #M90,M91 in cascode current configuration, responsive to bias voltage VDD, bias current thru #M92, and modulation current thru #92,93; col.6 lines 1-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser driver of Tan and Schuelke with the cascode circuit of Royer in order to adjust the bias current to compensate for a threshold shift (Royer, col.6 lines 45-48).

With respect to claim 4, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, but do not teach the driver to use a PTAT bandgap reference circuit using positive temperature coefficients for the predriver gain stages. Royer teaches a laser driver utilizing a PTAT bandgap reference (abs. lines 1-7) using positive temperature coefficients (col.3 lines 44-55) for the predriver gain stages (fig.2 bandgap reference #20 located before the other predriver elements #25, and hence any gain stages (additional transistors)). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser driver of Tan and Schuelke

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with the PTAT bandgap reference of Royer in order to appropriately change the current based on threshold changes due to temperature shifts.

With respect to claim 5, Tan, Schuelke, and Royer teach the laser driver as outlined in the rejection to claim 4 above, and further teach the modulation current to be externally adjustable (Tan, fig.2 #120, set value adjustable externally).

With respect to claim 13, Tan and Schuelke teach the laser driver as outlined in the rejection to claim 1 above, but do not teach the driver to use a cascode bias circuit coupled to bias the cascode devices to a bias voltage responsive to the power supply voltage, output bias current, and the modulation current. Royer teaches a laser driver utilizing a cascode bias circuit responsive to the power supply voltage, output bias current, and the modulation current (fig.9 #M90,M91 in cascode current configuration, responsive to bias voltage VDD, bias current thru #M92, and modulation current thru #92,93; col.6 lines 1-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser driver of Tan and Schuelke with the cascode circuit of Royer in order to adjust the bias current to compensate for a threshold shift (Royer, col.6 lines 45-48).

With respect to claim 14, Tan, Schuelke, and Royer teach the laser driver as outlined in the rejection to claim 13 above, and further teach the laser driver to comprise a laser driver utilizing a PTAT bandgap reference (Royer, abs. lines 1-7) using positive temperature coefficients (Royer, col.3 lines 44-55) for the predriver gain stages (Royer, fig.2 bandgap reference #20 located before the other predriver elements #25, and hence any gain stages (additional transistors)).

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With respect to claims 15, 16, and 18, Tan, Schuelke, and Royer teach the laser driver as outlined in the rejection to claim 13 above, and further teach the driver to be an integrated circuit (Tan, col.4 lines 39-40) and the predriver bias control (Tan, fig.2 #110, set value adjustable externally) and the modulation current are independently externally adjustable (Tan, fig.2 #120, set value adjustable externally).

With respect to claim 17, Tan, Schuelke, and Royer teach the laser driver as outlined in the rejection to claim 13 above, and further teach driver to be an integrated circuit (Tan, col.4 lines 39-40) and the predriver bias control (Tan, fig.2 #110, set value adjustable externally) and the modulation current are externally adjustable (Tan, fig.2 #120, set value adjustable externally). Tan, Schuelke, and Royer do not teach the change to be made by a single adjustment. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the bias and modulation currents into one signal as it is well known in the art to combine two related control signals into one in order to reduce time needed to make changes to the controlled device.

Allowable Subject Matter

Claim 22 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claims 11, 20, and 23-27 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 10, 12, 19, 21, and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claims 10-12, 19-21, and 22-28, these claims would be allowable after overcoming the rejections/objections listed above due to the fact that they all are limited by a pulldown variance circuit coupled to the predriver of the laser drive system, being used to cause a turn-off current of the predriver to be larger than a turn-on current of the predriver which was not found to be taught in prior art.

Conclusion

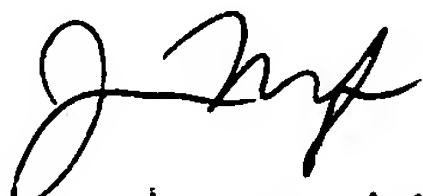
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR


JAMES MENEFFEE
for
MINSUN HARVEY